

PROPERTY PLANNING COMMON ELEMENTS

COMPONENTS OF MASTER PLANS

HABITATS AND THEIR MANAGEMENT

White Cedar

Description

This page describes management of white cedar swamp, a lowland minerotrophic conifer forest community comprised of >50% swamp conifers, with white cedar predominating. Cedar swamps occur on rich, neutral to alkaline peats and mucks throughout much of northern Wisconsin. They are relatively common in depressions that receive mineral-enriched groundwater, and can be associated with both ground moraine and outwash landforms. White cedar is the dominant species. A variety of canopy associates may occur, including tamarack, black spruce, white spruce, balsam fir, yellow birch, black ash, white birch, red maple, hemlock, balsam poplar, trembling aspen, American elm, and white pine. A tall shrub layer may be well developed and include speckled alder, alder-leaved buckthorn, wild currants, and mountain maple. Canada yew formerly was an important tall shrub in white cedar swamps but has greatly declined due to deer herbivory and is now rare or local. The understory is rich in mosses, lichens, liverworts, ferns, sedges, orchids, wildflowers such as goldthread, fringed polygala, and naked miterwort, and woody herbs or “sub-shrubs” such as twinflower and creeping-snowberry. A number of rare plants occur more frequently in white cedar swamps than in any other habitat.

White cedar is a shallow-rooted species, prone to windthrow, but is able to root from its branches (this is known as “layering”) and thus can continue growing following windthrow, as lateral branches oriented away from the ground continue growing vertically. These characteristics, along with those of diverse canopy associates, some of which grow taller than white cedar and have spreading crowns (e.g., yellow birch) and others (conifers) with narrow, spire-shaped crowns that protrude from the canopy, provide structural complexity. Similarly, the ground layer can be lush and hummocky, interspersed with pools of water that collect in hollows between hummocks, seeps, spring runs, and pit-and-mound microtopography created when large trees tip over. These smaller-scale structural features are used by many species of mammals, birds, herps, invertebrates, and some plants. Older stands of white cedar swamp are among the most structurally complex forest communities in Wisconsin and are major repositories of botanical diversity.

Ecological Landscape Opportunities

Ecological Landscape	Opportunity*
Forest Transition	M
North Central Forest	M
Northeast Sands	M
Northern Lake Michigan Coastal	M
Central Lake Michigan Coastal	I
Northern Highland	I
Northwest Lowlands	I
Northwest Sands	I
Southeast Glacial Plains	I
Superior Coastal Plain	I



Ecological Landscape	Opportunity*
Central Sand Hills	P
Western Coulee and Ridges	P

M = Major; major opportunity exists in this Landscape; many significant occurrences are recorded, or restorations likely to be successful.

I = Important; several occurrences important to maintaining the community in the state occur in this Landscape.

P = Present; community is present in the Landscape but better opportunity exists elsewhere.

Rare Species

Many Species of Greatest Conservation Need (SGCN) are associated with white cedar swamp based on the findings in [Wisconsin's 2015 Wildlife Action Plan](#). To learn more, visit the [Northern Forest communities page](#) and click on "Northern Wet-mesic Forest".

Threats

- Altered hydrology is a primary threat to white cedar. The vegetation is dependent on a reliable flow of groundwater. Altered hydrology (high water table, stagnant or slow-moving groundwater, or flooding) due to beaver activity, dam or dike construction, or poorly designed and constructed rights-of-way (roads, railroads, powerlines, pipelines) may damage or drown alter extensive areas of conifer swamp. Waters carrying excess sediments or nutrients can change plant community composition and structure.
- Excessive browse damage by white-tailed deer is a serious threat to the persistence of white cedar. Young cedars seldom advance beyond the seedling stage because seedlings and small saplings are frequently consumed by deer and are now scarce or absent from many stands across the state. Snowshoe hare and deer mice can also inhibit white cedar regeneration.
- The spread of exotic invasive plants such as glossy buckthorn, reed canary grass, and European swamp thistle is a threat to white cedar swamps.
- Reliable techniques to manage and regenerate white cedar need to be further developed. Many regenerating second-growth stands are dominated by species such as balsam fir, black ash, or tall shrubs like speckled alder or mountain maple rather than white cedar.
- Forest management practices such as clearcutting in forests surrounding white cedar swamps may create problems by isolating white cedar stands and concentrating deer browse, as deer seek out the cedar stands for food and thermal cover in winter. Isolating white cedar stands can also make them more vulnerable to windthrow, and openings created in such situations can quickly dry out or be colonized by invasive plants.
- White cedar is projected to undergo significant decreases in habitat suitability due to climate change. It requires a cold climate and is vulnerable to fire and herbivory.

Management Techniques

- Clearcut (progressive strip)
- Overstory removal
- Shelterwood



- Group selection
- Passive management
- Patch selection
- Seed tree
- Single-tree selection
- Site preparation
- Intermediate treatments
- Pesticide treatments

Management Considerations

- Wherever possible, manage white cedar as part of a complex of related and interconnected forest and wetland habitats.
- Protect and maintain large and/or high-quality examples of white cedar swamp, particularly when adjacent to other intact habitats. Where possible, manage for larger stands, larger blocks, to increase connectivity with surrounding native habitats, and to soften sharp transitions between habitat types.
- Reliable techniques to manage and regenerate white cedar need to be further researched and developed. Establishing advanced cedar regeneration is critical, and partial harvest methods such as strip shelterwood or group selection show the most promise. Consideration must be given to deer herbivory and impacts of interfering vegetation on regeneration.
- Carefully consider both landscape (watershed; surrounding land uses and vegetation; patch size, etc.) and site (hydrology; species composition; soils and topography; stand age, etc.) features and develop a management approach based on this assessment. Use an adaptive management approach and monitor results.
- Passive management may be employed for white cedar, particularly where trees are small, slow-growing, non-merchantable, or where regeneration is unlikely due to deer densities. Retain all white cedar in mixed stands.
- In stands with a large component of black ash, consider how management to mitigate emerald ash borer damage (i.e., pre-salvage or salvage) may affect the ability to maintain white cedar.
- Maintain or restore site hydrology whenever feasible.
- Use management practices that limit soil damage, erosion, sedimentation, and hydrologic changes to the stand and to adjacent areas.
- Conduct timber harvests only under frozen-ground or very dry conditions to prevent rutting and soil damage and to protect site hydrology.

